narda

RETURN TO
AEROSPACE DIV.

the narda microwave corporation
MINEOLA, NEW YORK.

NARDA HARMONIC MIXERS

MODELS V517 - 524

DATA SHEET

narda

HARMONIC MIXER

SPECIFICATIONS

Frequency Range (kmc)	Band	Waveguide (in)	Crystal* Type	Narda Model
1.00-[illegible].00	L-S	Coaxial Type N	1N21B	524
3.95-5.85	C	2 X 1	1N23B	523
5.30-8.20	XN	1 1/2 X 3/4	1N23B	522
7.05-10.0	XB	1 1/4 X 5/8	1N23B	521
8.20-12.4	X	1 X 1/2	1N23B	520
12.4-18.0	KU	.702 X .391	1N78	519
18.0-26.5	K	1/2 X 1/4	1N26	518
26.5-40.0	V	.360 X .220	1N53	V517

*Not included.

DESCRIPTION

Narda Harmonic Mixers consist of a waveguide or coaxial section, depending on the model used, designed to hold a silicon crystal element with provision for the injection of a standard frequency signal at a submultiple of the frequency in the waveguide or coaxial section. These two signals are heterodyned in the crystal and the difference frequencies are obtained at a type BNC output jack. The waveguide models utilize a broad band choke at the type N subharmonic input to prevent loss of signal and a by-pass capacitor at the BNC output to allow the passage of signals up to 60 mc. in Models 521 through 524, and up to 250 mc. in Models V517 through 520. A tuneable short is located in the waveguide to adjust the input impedance.

APPLICATIONS

Harmonic mixers perform, in conjunction with the local oscillator, the function of frequency conversion of a microwave signal. This characteristic makes Narda Harmonic Mixers useful in frequency calibration set-ups where a standard signal from 30 to 3000 mc. is available and is to be compared with an unknown microwave signal, in microwave receivers where frequency conversion is required, and as harmonics generators.

a. Frequency Measurement-

The attached figure shows a typical set-up for the measurement of frequency. A frequency modulated signal is used along with a standard frequency signal produced by a transfer oscillator, monitored by a counter, or by a multiplier chain controlled by a crystal oscillator. Standard frequencies up to one-half the signal frequency may be used.

As the frequency- modulated signal sweeps through a harmonic of the standard frequency, a heterodyne beat occurs. When setting a frequency meter or filter to a specific frequency, the cavity response may be displayed on an oscilloscope with the beat marker pip riding on the response curve.

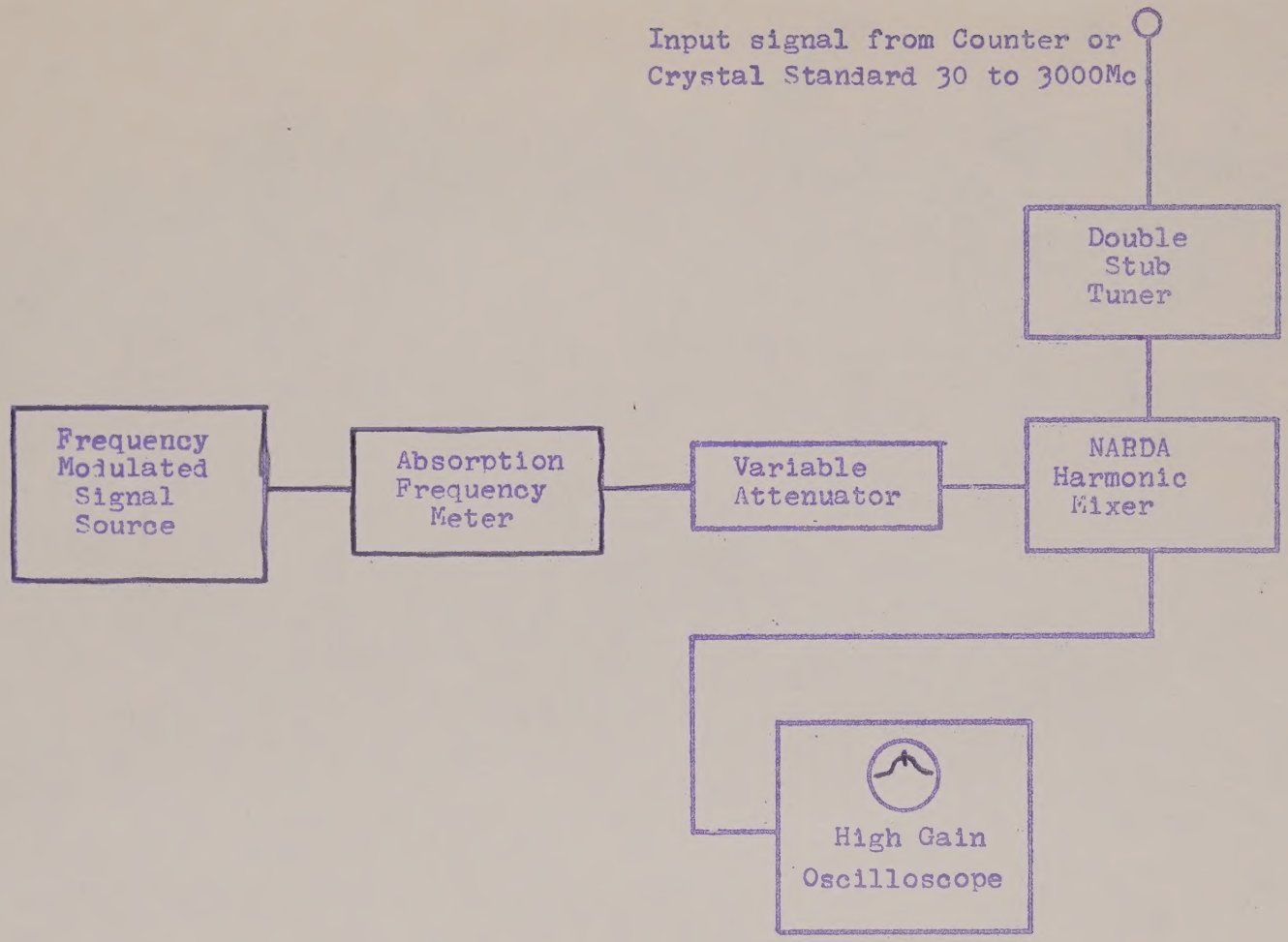
A d-c path for the crystal current must be provided in the standard frequency input, otherwise efficient mixing will not occur. If the standard frequency source has no d-c path, a Narda Model 903 Double Stub Tuner may be used for the d-c return. The Narda Model 756-6 Attenuator is ideally suited for this purpose when the standard frequency is below 1500 Mc.

b. Receiver Mixer-

The Harmonic Mixer may be used as part of a microwave receiver. Connection is the same as when using an ordinary mixer, except the local oscillator must be at a one-half or lower subharmonic of the signal frequency. (The mixer will not operate if the local oscillator frequency is within the operating frequency range.)

c. Harmonic Generator-

By shorting the BNC output jack and injecting a sub-harmonic at the local oscillator input, the mixer will perform as a harmonic generator. The harmonic signals are obtained at the primary line or waveguide input.



FREQUENCY MEASUREMENTS
WITH A NARDA HARMONIC MIXER